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1903.—No. 6.

DEPARTMENT OF THE INTERIOR.

BUREAU OF GOVERNMENT LABORATORIES.

I. NEW OR NOTEWORTHY PHILIPPINE PLANTS.
II. THE AMERICAN ELEMENT IN THE PHILIPPINE FLORA.

BY ELMER D. MERRILL, BOTANIST.

ISSUED JANUARY 20, 1904.

MANILA:
BUREAU OF PUBLIC PRINTING.
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LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
BUREAU OF GOVERNMENT LABORATORIES,
OFFICE OF THE SUPERINTENDENT OF LABORATORIES,
Manila, P. I., August 31, 1903.

SIR: I have the honor to transmit herewith two papers, the first entitled "New or Noteworthy Philippine Plants," and the second "The American Element in the Philippine Flora," by Elmer D. Merrill, botanist.

I am, very respectfully,

PAUL C. FREER,
Superintendent of Government Laboratories.

Hon. LUKE E. WRIGHT,
Acting Secretary of the Interior.

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I. NEW OR NOTEWORTHY PHILIPPINE PLANTS.

By ELMER D. MERRILL.

The material upon which the present paper is based has been collected during the past year and is deposited in the herbarium of the Bureau of Government Laboratories, Manila. The numbers cited, unless otherwise stated, are those of the author's distribution. Duplicates have been distributed to the United States National Herbarium, Washington; the K. K. Botanische Garten, Berlin; the Royal Gardens, Kew; the New York Botanical Gardens, and other institutions. As yet there has been little opportunity to critically study the many interesting species in the collection, and the present paper records only a few notes on some of the most characteristic species.

ANACARDIACEÆ.

SEMECARPUS GIGANTIFOLIA F. Villar, Nov. App. Fl. Filip. August. Add. et Corrig. 350. 1883; Vidal, Sinopsis, Atlas, XXII. *t. 36. f. A.* 1883.

This most distinct and interesting species is not noted in Index Kewensis, and is represented in our herbarium by No. 2491, Lamao River, Mount Mariveles, Province of Bataan, Luzon, June 11, 1903, also by No. 511 (Ahern), Tetuan, Province of Zamboanga, Mindanao, 1901. The specimens observed at Lamao River were trees 10 m. high and about 20 cm. in diameter, unbranched or with very few (three or four) ascending branches, the leaves, which exceed 1 m. in length, being crowded at the apices of the branches, giving the plant a striking, almost palm-like appearance. The fruit is borne in great abundance on panicles 10 to 20 cm. long, the entire length of the trunk. The hypocarp is very fleshy, deep purple when ripe, 3 to 4 cm. long, and edible, although somewhat puckery. Known by the Tagalogs as *Tocud langit* and by the Visayans as *Manalu*.

BORRAGINACEÆ.

EHRETIA MOLLIS (Blanco). (*Menais mollis* Blanco, Fl. Filip. 139. 1837; *Ehretia virgata* Naves. Fl. Filip. August. *t. 70.* 1880, excel. syn.; *E. onava* F. Vill. Nov. App. Fl. Filip. 138. 1883, p. p., non A. DC.; *E. navesii* Vidal, Rev. Pl. Vasc. Filip. 194. 1886.)

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COMPOSITÆ.

VERNONIA VIDALII Merrill, sp. nov. (*Vernonia arborea*, Ham. var. *vestita* Vidal, Rev. Pl. Vasc. Filip. 160. 1886, non *V. vestita* Baker.)

This is evidently a distinct species, being represented in our herbarium by No. 153, a small tree, 8 to 10 m. high, with pale purple flowers, collected in the mountains between Bagabag and Quiangan, Province of Nueva Viscaya, Luzon, June 7, 1902, also No. 2291, Tanay, Province of Rizal, Luzon, May, 1902. Tagalog, *Malasambong*.

CONIFEREÆ.

PINUS INSULARIS Endl., and P. MERCUSII Jungh. and De Vriese.

Species of the genus *Pinus* are found in the mountains of northern Luzon, in the Province of Nueva Ecija, Nueva Viscaya, Zambales, Benguet, and Lepanto-Bontoc, the most widely distributed species being *Pinus insularis* Endl., which is apparently very closely related to *Pinus khasya* Royle, from Burma. Specimens from Benguet have been identified as the latter species. *Pinus mercusii* Jungh. and De Vriese, has been found only in the Province of Zambales, and from material recently received, distributed as No. 2116, it appears doubtful if the Philippine specimens so referred are really this species. *Pinus mercusii* Jungh. and De Vriese, has only two leaves in a fascicle, while *Pinus insularis* Endl., has three leaves in a fascicle. In No. 2116, on the same branch about one-half of the fascicles contain two leaves and the other half contain three leaves. Other specimens, No. 1158 (Merrill) and No. 829 (Ahern) from Zambales invariably contain two leaves in a fascicle, while the specimens Nos. 1161, 1162, 1163, 1164, 1165 (Merrill), Nos. 830, 852 (Ahern), and Nos. 121, 122, 123, 124 (Topping), from Benguet, always contain three leaves in a fascicle. It is very difficult to separate *Pinus insularis* Endl. and *Pinus mercusii* Jungh. and De Vriese on any characters other than the number of leaves in a fascicle, and it is suggested that the Philippine material identified as *Pinus mercusii* Jungh. and De Vriese, may be only a form of *Pinus insularis* Endl. The specimens of *Pinus* in our herbarium are extremely variable, and may represent one variable species, or several closely related ones. The Igorrotes in Benguet have distinctive names for different forms of *Pinus insularis* Endl., but their names are, I believe, based upon the amount of resin in the tree, rather than upon any vegetative or floral characters. The native names for *Pinus* are: Tagalog, *Salong* or *Saleng;* Zambales, *Tapulao;* Ilocano, *Parua;* Igorrote, *Al-al.*

GRAMINEÆ.

EREMOCHLOA LEERSIODES (Munro) Hack. in DC. Prodr. **6**: 264. 1889. (*Ischaemum leersiodes* Munro, Proc. Amer. Acad. **4**: 363. 1864–65.)

This species, previously known only from southern China and California, introduced in the latter place, was found growing abundantly in open grass lands near Echague, Province of Isabela, Luzon, June 11, 1902, dis-

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tributed as No. 138. No species of this genus has been previously reported from the Philippines.

ORYZA GRANULATA Nees et Arn. in Wall. Cat. No. 8634. 1828. (*O. filiformis* Herb.; *O. meyeriana* Zoll. et Mor.)

This species was found sparingly along trails in dense damp forests in the hill country near Quiangan, Province of Nueva Vizcaya, Luzon, June 6, 1902, No. 116. This number differs from *Oryza granularis*, as described, in its somewhat larger spikelets, but is manifestly this species, which is distributed from the Himalayan region to Malabar, Madura, Java, and Celebes.

POLYTRIAS PRAEMORSA (Nees) Hack. in DC. Monog. Phanerog. 6: 189. 1889. (*Pollinia praemorsa* Nees.)

This species, previously known only from Java, was found growing abundantly in dry, open, waste places, Manila, December 6, 1902, distributed as No. 386. It is quite evident that this species is not a native of the Philippine Islands, but has been introduced from Java or from Singapore; it is very common at Singapore and may be also a native of that region or may have been introduced from Java. It is one of the most common and widely distributed species of the *Gramineæ* in the Island of Java.

LEGUMINOSÆ.

PTEROCARPUS BLANCOI Merrill, sp. nov. (*P. santalinus* Blanco, Fl. Filip. ed. 1, 561. 1837, non Linn. f.)

This species is very different from *Pterocarpus santalinus* Linn. f., being distinguished by its acuminate, not obtuse, leaflets and much larger pods. The wing of the pod is much broader in this species than in *Pterocarpus indicus* Willd., while *P. santalinus* Linn. f., is described as having a pod with a narrower wing than that species. It is distinguished from *P. indicus* by its longer, acuminate leaves and larger pods. According to Hooker *P. santalinus* Linn. f., does not extend to the Malayan region.

This species is known to the natives as *Narra* or *Asana*, both names also being applied to *Pterocarpus indicus* and *P. echinatus*, but *P. blancoi* has also a distinctive name *Apalit*, probably on account of its odorous wood. It is believed that the wood of the other two species noted above is without this distinctive odor.

This species is represented in the herbarium by No. 2881, Tarlac, Province of Tarlac, Luzon, July, 1903.

MEZONEURUM RUBRUM Merrill, sp. nov.

A robust prickly climber 6 to 10 m. long, with large obtuse, glabrous leaflets and oblong long-pedicelled red pods. Leaf-rachis 5 to 6 dm. long, glabrous, with stout retrorse prickles on the under side; pinnae 6, 1dm. long, 6-jugate; leaflets firm ovate or obovate, glabrous, obtuse or emarginate at the apex, the base obtuse, inequalateral, 5 to 6 cm. long, 2.5 to 3 cm. wide, the nerves not prominent, freely anastomosing; petiolules 3 mm. long. Racemes as long as the leaves, pubescent. Flowers unknown.

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Pods thin, glabrous, 4 to 5 seeded, 15 cm. long, 4 to 5.5 cm. wide including the wing, which is 1 cm. in width; pedicels 2.5 to 3 cm. long.

Type specimen No. 805, growing in thickets, Point Seperation, Paragua, February 18, 1903.

This species is probably most closely related to *Mezoneurum sumatranum* Miq., but may possibly not belong to the section *Tubicalyx*, it being impossible to determine this point with the material at hand. It differs from that species in its smaller number of pinnæ and leaflets, smaller leaflets, longer pods and long pedicels.

MELIACEÆ.

SANDORICUM VIDALII Merrill, sp. nov. (*S. borneense* Vidal, Cat. Pl. Prov. Manila; F. Vill. Nov. App. 43, non Miquel.)

A tree reaching a height of 20 m., with glabrous ovate, acute or slightly acuminate leaves, reflexed petals and glabrous ovaries. Branches glabrous, gray. Leaves 1.5 to 2.5 dm. long, the petioles 5 to 7 cm. long; leaflets ovate, the base acute, 6 to 14 cm. long, 4 to 9 cm. wide, the nerves 8 to 10 pairs, petiolules of the lateral leaflets 5 mm. long, those of the terminal leaflet 3 cm. long. Panicles glabrous, many flowered, 5 to 6 cm. long. Flowers 6 to 7 mm. long, their pedicels about the same length. Calyx glabrous, cup shaped, with 5 obscure, broad, rounded teeth. Petals 6 to 7 mm. long, 2 mm. wide, glabrous, obtuse, recurved in anthesis. Staminal tube cylindrical, ridged, not ventricose, 5 to 6 mm. long, with 10 obscure teeth. Ovary glabrous. Style 3 to 4 mm. long. Stigmas 5, distinct, erect, 1 mm. long. Fruit (immature), globose, somewhat flattened, 2.5 cm. in diameter, minutely and densely velvety-pubescent.

Type specimen No. 1824, Bosoboso, Province of Rizal, Luzon, April, 1903 (flower). The following specimens are also referred here. No. 2279, Tanay, same province, May, 1903 (fruit); No. 2060, Guinayangan, Province of Tayabas, Luzon, April, 1903 (fruit); No. 1923, from Pagbilao, Province of Tayabas (flower), is also doubtfully referred here, differing from the type in some minor characters.

This species is evidently most closely related to *Sandoricum maingayi* Hiern, from Malacca, but is distinct from that species. It is undoubtedly the species erroneously identified by Vidal as *Sandoricum borneense* Miq. This tree grows in dry hill forests, reaching a height of 20 meters, and a diameter of 60 cm., the sap wood is white or pink and the heart wood is of a violet color, it being used by the natives in the construction of houses. The watery sap has a faint odor, similar to that of *Sandoricum indicum*. Tagalog *Malasantol*, literally "false santol," in distinction from the true santol, *Sandoricum indicum* L.

MORACEÆ.

FICUS LUZONENSIS Merrill, sp. nov. (*Eusyce.*).

A small tree with firm ovate, somewhat pubescent leaves and long-peduncled, globose, densely pubescent receptacles. Leaves 7 to 10 cm.

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long, 3 to 4 cm. wide, ovate or ovate-lanceolate, apex acute, or obtuse, base acute, margins entire, rather strongly revolute, glaucous and harsh above, with few scattered, striate hairs, beneath usually densely brown-punctate, nerves rather prominent, 4 to 6 pairs, which with reticulations are rather densely pubescent; petioles 2 to 2.5 cm. long, densely pubescent; stipules lanceolate, acute, densely pubescent, nearly 1 cm. long. Receptacles, long-peduncled, solitary, or in pairs from the axils of the leaves, globose, densely tomentose, 6 to 7 mm. in diameter, abruptly constricted at the base into a slender stalk 3 mm. long, at the juncture of this stalk with the pedicel are three broad, obtuse bracts 1.5 mm. long; peduncle proper pubescent, 1.5 to 2 cm. long; umbilicus, rather prominent, 3 mm. in diameter. Male flowers long-pedicellate, mixed with gall flowers all over the interior of the receptacle, evidently the same as in *Ficus macropoda* Miq.

Type specimen collected at Baler, Province of Principe, Luzon, No. 1059, September, 1902. Tagalog, *Malananca*.

A species of the section *Eusyce*, related to *Ficus macropoda* Miq., and *F. pedunculosa* Miq., both species being found in the Philippines, the former endemic, the latter being also known from Beroe and Celebes. It is, however, more closely related to the former, from which it is distinguished by its smaller leaves, which are acute, not emarginate at the base, much longer petioles, punctate under the surface of the leaves, and very much longer peduncles. See King, Ann. Bot. Gard. Calcutta, **1**: 144, 145. *pl. 182, 183.*

FICUS PSEUDOPALMA Blanco, Fl. Filip. ed. 2, 473. 1845, ed. 3, **3**: 84. 1879.

This species, not listed in "Index Kewensis," is most distinct, and possibly should represent the type of a new section of the genus *Ficus*, although it is placed by F. Villar,[1] in the section *Covellea*. Naves, in identifying the plates for the third edition of Blanco's Flora de Filipinas, reduces *Ficus pseudopalma* Blanco to *F. difformis* Lam., but in this error he is not followed by F. Villar in the Novissime Appendix. The figure of this species, plate 356, Fl. Filip. Aug. does not well represent the species.

Ficus pseudopalma Blanco is a very characteristic and well-marked species, especially in its habit of growth, and is evidently widely distributed in the Philippines. It is probably endemic to the Archipelago, but an excellent example is in cultivation in the Botanical Gardens at Singapore, which was received from Manila. This species has a straight unbranched stem, from 3 to 6 m. in height, and from 4 to 6 cm. in diameter, the leaves which are from 5 to 8 dm. long, being all crowded at the apex of the stem, giving the plant a palm-like appearance. The leaf scars are very large and prominent, as are the lanceolate, acute, stipules, which are from 5 to 7 cm. long. The receptacles are dark green, ovate, usually more or less angular, 3 to 4 cm. long, usually in pairs, on short peduncles in the axils of the leaves.

This species is represented in our herbarium by No. 983, Calapan, Mindoro, April, 1903, and No. 1958, Pagbilao, Province of Tayabas, Luzon, April, 1903. It is known by the Tagalogs as *Niog-niogan*, and by the Visayans as *Sulamiog*.

[1] Nov. App. Fl. Filip. 201. 1883.

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MYRTACEÆ.

XANTHOSTEMON SPECIOSUM Merrill, sp. nov.

A small tree, about 10 m. high, with ovate or obovate leaves and terminal cymes, bearing from 2 to 4 showy crimson flowers. Bark gray, ultimate twigs with scattered hairs. Leaves alternate, ovate, or obovate, obtuse or rounded at the apex, tapering to the cuneate base, 6 to 8 cm. long, 3 to 4.5 cm. wide, entire, coriaceous, nearly glabrous except for a few scattered striate hairs on both surfaces, beneath black-punctate, nerves 9 or 10 pairs, not prominent, anastomosing near the margin; petioles, 1 cm. long or less, with few appressed hairs. Inflorescence terminal, 4 to 5 cm. long, 2 to 4 flowered; peduncles pubescent; pedicels 2 to 3 mm. long; bracteoles linear, 5 mm. long, pubescent. Calyx tube 0.5 mm. long, 1.5 cm. in diameter, somewhat pubescent, the lobes five, triangular, spreading, acute, sparingly pubescent, 3 to 4 mm. long, alternating with the calyx lobes are five prominent depressions in the calyx tube. Corolla spreading, the petals crimson, orbicular, 6 mm. long, 8 mm. wide, slightly ciliate on the margins. Stamens about 20, exserted, crimson, arranged in a single series; filaments about 2 cm. long; anthers 2.5 mm. long. Ovary 3-celled. Style 2 cm. long; stigma unknown. Fruit unknown.

Type specimen No. 682, collected in a dry, open, grassy valley near Halsey Harbor, Island of Culion, February 12, 1903. A tree about 10 m. high and 3 dm. in diameter, with exceedingly hard, dark-colored wood.

This species is quite distinct from *Xanthostemon verdugonianus* Naves, the only other species of this genus found in the Philippines. Its distinguishing characters are its much larger flowers, very short but broad calyx tube, larger petals, crimson filaments, etc.

XANTHOSTEMON VERDUGONIANUS Naves, in F. Vill. Nov. App. Fl. Filip. 82. 1883; Fl. Filip. ed. 3, *t. 300;* Vidal, Sinopsis, Atlas, *t. 49. f. K.* 1883.

This species is represented in our herbarium by No. 428 (Ahern), Island of Tinago, 1901 (in fruit), and by No. 34 (Howard Long), Placer, Province of Surigao, Mindanao, May 20, 1903 (in flower). This species grows to a much larger size than *Xanthostemon speciosum*, reaching a height of 50 m. It is known by the Visayans as *Magcono* and *Mancono*. Is much prized for its exceedingly hard durable wood, and is said to be abundant in the Province of Surigao. It is well represented by the figures of Naves and Vidal cited above.

So far as is known, with one exception, the two Philippine species here noted are the only ones of this genus that have been discovered outside of Australia and New Caledonia, and up on the present time no species of this genus has been discovered in New Guinea although one species has been described from Celebes. Both of the Philippine species differ from the other species in the genus by their smaller number of stamens.

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OLEACEÆ.

MAYEPEA CUMINGIANA (Vidal).

Linocicra cumingiana Vidal, Phanerog. Cuming. Philip. 185. 1885.

MAYEPEA CORIACEA (Vidal).

Linocicra coriacea Vidal, Rev. Pl. Vasc. Filip. 181. 1886; *L. purpurea* F. Vill. Nov. App. 128. 1883, non Vahl.

RHAMNACEÆ.

ZIZYPHUS ARBOREA Merrill, sp. nov.

A large tree, reaching the height of 40 m., with a diameter of 60 cm. above the buttresses, which extend to a height of about 3 m. on the trunk, with broad, ovate, often subcordate leaves, which are glabrous on both surfaces, and globular, minutely rufous-tomentose drupes about 2 cm. in diameter. Branches unarmed, the younger ones more or less rufous-pubescent. Leaves broadly ovate, acute, the base often somewhat oblique, acute or subcordate, 8 to 12 cm. long, 4 to 7 cm. wide, entirely glabrous, with three strong unbranched, vertical nerves, the secondary nerves leading from the lateral vertical nerves, 10 or 12, prominent, margins entire or sub-crenate; petioles about 1 cm. long, often slightly pubescent. Inflorescence of axillary peduncled cymes, usually forming a terminal cymose, leafy, panicle; peduncle 3 to 4 cm. long. Flowers unknown. Drupe globose 2 cm. in diameter, minutely rufous-tomentose, 2-seeded, the pulp scanty, the endocarp bony.

The following specimens represent this species, all from the Province of Tayabas, Luzon. Pagbilao, No. 1929 (type), Feb. 11, 1903; No. 1983, March 14, 1903; Guinayangan, No. 2017, April 13, 1903. A frequent tree on the hills and table lands, the timber being used for the construction of bancas (native canoes) and houses. It is not, however, durable when exposed to the weather. Tagalog, *Ligaa* and *Danlic*.

A species distinguished by its large size, well developed buttresses, spineless branches, and glabrous leaves.

RHIZOPHORACEÆ.

BRUGUIERA RITCHIEI Merrill, sp. nov.

A shrub or small tree 12 m. high or less, with lanceolate leaves, oblong, cylindrical striate calyx, and very short erect calyx lobes. Trunk 25 cm. in diameter or less; bark rough. Leaves ovate-lanceolate, somewhat coriaceous, 6 to 11 cm. long, 2 to 3.5 cm. wide, acute, tapering to the base, glabrous, slightly pale, and densely punctate beneath, nerves about 16 pairs, not prominent, anastamosing near the margin; petioles 2 cm. long. Inflorescence axillary; peduncles solitary, 1.5 to 2 cm. long, bearing several flowers, of which usually only one develops. Flowers unknown; fruiting calyx, cylindrical, somewhat channeled, 1 to 1.5 cm. long, 5mm. in diameter, abruptly tapering to the pedicel, which is 1 to 1.5 cm. long; calyx lobes, 8 very short, acute, erect, 3 mm. long. Fruit in the fundus of the calyx, with the growing radicle protruding 10 cm. or more.

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This interesting and well-marked species was first collected at Pola, Mindoro, in mangrove swamps, by Mr. J. W. Ritchie, while making some investigations on tan barks and dye woods for the Forestry Bureau, in May, 1903, distributed as number 2463 (type), No. 2487, from Guinayangan, Province of Tayabas, Luzon, May, 1903, also represents this species. It is known by the Tagalogs in Mindoro as *Hangaray* and *Hagalay*, while the Tagalogs in Tayabas call it *Pototan*.

A species at once distinguished from others in the genus by its elongated, cylindrical calyx, and very short calyx lobes.

RUTACEÆ.

AEGLE GLUTINOSA (Blanco). (*Limonia glutinosa* Blanco, Fl. Filip. ed. 1, 358. 1837; *Feronia ternata* Blanco, l. c., ed. 2, 252. 1845; l. c., ed. 3, **2**: 104. 1878; *Aegle decandra* Naves in Blanco, Fl. Filip. ed. 3, *t.* 124; F. Vill. Nov. App. 38. 1880.)

SAPINDACEÆ.

TRISTIRA PUBESCENS Merrill, sp. nov.

A small or medium sized tree, 10 to 12 m. high with densely rusty pubescent leaves, inflorescence, and young branches. Leaves pinnate, the densely rusty pubescent rachis 10 to 12 cm. long; leaflets 4 to 5 pairs, lanceolate-ovate, 6 to 8 cm. long, 1.5 to 2.5 cm. wide, densely rusty pubescent beneath, and sparingly so above, the apex blunt or obscurely acute, the margins entire, nerves about 15 pairs, petiolules 2 to 3 mm. long. Fruiting panicles about 15 cm. long, the rachis and branches densely rusty pubescent. Calyx lobes five, pubescent. Fruit triangular, ovate, 2 to 3 cm. long, rusty pubescent, woody, the wings narrow near the base of the fruit, about 5 mm. wide above, the three joining and terminating in a short point at the apex of the fruit, the three cells lined with a dense, white woolly tomentum.

Type specimen No. 2842, Bosoboso, Province of Rizal, Luzon, July 19, 1903. Tagalog *Arupay*.

A very distinct species, at once distinguished from the other two species in the genus by its dense rusty pubescence. *Tristera triptera* Radlk., the only other species of the genus from the Philippines, is almost glabrous, with much larger leaves and larger fruits than in *Tristira pubescens*. The flowers of no species of this genus are known at present.

SAPOTACEÆ.

Although the genus *Palaquium* was based on Philippine material, very little definite information has been available regarding the several species found in the Archipelago. Blanco in establishing the genus described three species, all of which are known to us today. Fernandez-Villar credits seven species to the Archipelago, of which one is described as new and two of which were erroneously credited to the Archipelago. Vidal notes but

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three species, while in the present enumeration 11 species are considered. All the material on which the present enumeration is based has been collected since the American occupation, and as more thorough collections are made we may expect that this list will be considerably extended.

Key to the species of Palaquium at present known from the Philippine Islands.

Leaves rusty-tomentose or pubescent beneath.
- Leaves obovate, obtuse.
  - Leaves 15 cm. long or less; nerves, 12 to 13 pairs.....*P. barnesii*
  - Leaves 20 to 30 cm. long; nerves, about 16 pairs.....*P. latifolium*
- Leaves acute or acuminate.
  - Leaves acute, 15 to 18 cm. long.....*P. ahernianum*
  - Leaves acuminate, 20 to 30 cm. long.....*P. oleiferum*

Leaves glabrous beneath.
- Leaves 40 to 50 cm. long.....*P. gigantifolium*
- Leaves 20 cm. long or less.
  - Nerves, 8 or 9 pairs.....*P. lanceolatum*
  - Nerves, 12 to 17 pairs.
    - Leaves acute or acuminate.
      - Nerves, 12 pairs.....*P. celebicum*
      - Nerves, 14 pairs.....*P. mindanaense*
      - Nerves, 17 pairs.....*P. sp. indet.*
    - Leaves obtuse.
      - Nerves distinct; leaves 12 cm. long or more; petioles 3 to 4 cm. long.....*P. luzoniense*
      - Nerves obscure; leaves 6 to 8 cm. long; petioles 1 to 1.5 cm. long.....*P. cuneatum*

PALAQUIUM BARNESII Merrill, sp. nov.

A tree 35 to 40 m. high, with obovate pubescent leaves, numerous flowers and long peduncled fruits. Ultimate branches densely fulvous-pubescent. Leaves membranaceous, 8 to 10 cm. long, 6 to 8 cm. wide, obtuse or rounded at the apex, gradually tapering to the cuneate or abruptly acute base, both surfaces beset with numerous brownish hairs, the upper surface becoming nearly smooth with age, nerves about 12 pairs, rather prominent beneath, and densely brown-tomentose; petioles 1 to 1.5 cm. long, densely brown-tomentose. Flowers with brown-tomentose pedicels and sepals, the sepals triangular, acute, 3 to 4 mm. long. Petals unknown. Fruit ovate or ovate-oblong, glabrous, 3.5 cm. long, the calyx persistent. Peduncles 4 cm. long, brown-tomentose.

Type specimen No. 2757, Marintoc River, Island of Masbate, June 27, 1903, growing on the river bank, at an elevation of about 20 m. above the level of the sea. The trunk reaches a diameter of 70 cm. and the buttresses are not well developed. This species yields but a small amount of latex, which is not utilized by the natives. It is named in honor of Mr. P. T. Barnes, collector for the Forestry Bureau, who first secured specimens. Visayan, *Nato.*

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PALAQUIUM LATIFOLIUM Blanco, Fl. Filip. ed. 1, 404. 1837; *Bassia blancoi* A. DC. in DC. Prodr. **8**: 199. 1844; *Dichopsis latifolia* F. Vill. Nov. App. 124. 1883.

This characteristic species is represented in the herbarium by No. 1675, Antipolo, Province of Rizal, Luzon, and Nos. 1941 and 1919, Pagbilao, Province of Tayabas, Luzon. It is readily distinguished by its obovate, obtuse leaves, which are 2 or 3 dm. long and densely rusty-tomentose and shining beneath. Tagalog *Alacap; Palac palac.*

PALAQUIUM OLEIFERUM Blanco, l. c., 405. (*Bassia oleifera* A. DC., l. c., 198; *Dichopsis oleifera* V. Vill., l. c., 125.)

This species is apparently closely related to the preceding, but is distinguished by its narrower leaves, which are acute, not obtuse, and which are oblanceolate in form. The seeds of this species yield an oil which is utilized by the natives. It is represented in the herbarium by the following specimens, all without fruit or flowers: No. 1402, Arayat, Province of Pampanga, Luzon, and a specimen from the same province without locality, collected by M. Martines. A specimen from Mindanao, No. 21 (Sherman), appears to belong here. When more complete material is secured we shall be better able to judge the validity of this species. Tagalog, *Palac palac, Alacap;* Pampangan, *Malasaputi;* Ilocano, *Daracan.*

PALAQUIUM AHERNIANUM Merrill, Forest. Bu. Bull. **1**: 46. 1903.

A species related to *Palaquium lobbianum* Burck, but quite distinct. Mindanao, Province of Zamboanga, 608, 842 (Ahern), Moro, *Calapia.*

PALAQUIUM GIGANTIFOLIUM Merrill, sp. nov.

A tree 18 m. high, with very large, glabrous, obovate-lanceolate leaves 5 dm. long. Ultimate branches 1 to 1.5 cm. in diameter. Leaves glabrous on both surfaces 4.5 to 5.5 dm. long, 20 to 22 cm. wide, the apex obtuse or acute, gradually narrowing to the abruptly rounded base, nerves prominent, 22 pairs; petioles 4 cm. long, 1 cm. in diameter. Flowers very numerous 5 to 8 in fascicles on the branches below the leaves; pedicels thick, 1 cm. long, rusty-tomentose. Calyx 8 to 10 mm. long, the lobes obtuse, the outer ones firm, rusty-tomentose, the inner ones membranaceous. Corolla 3 cm. in diameter, the lobes lanceolate acute 1.5 cm. long, 5 cm. wide. Stamens, 18; filaments, 7–8 mm. long. Anthers 4 mm. long. Fruit unknown.

Type specimen No. 2845, Pagbilao, Province of Tayabas, Luzon, March, 1903. Growing in forests on hillsides about 50 m. above the sea level. A tree reaching a diameter of 25 cm. with very small or no buttresses and a nearly smooth dark gray bark that yields a small amount of latex, not utilized by the natives.

This very distinct species differs from all others in the genus in its very large leaves and flowers.

PALAQUIUM CUNEATUM Vidal, Sinopsis, Atlas, *t. 62. f. K.* 1883, non *Bassia cuneata* Blume, Bijdr. 675; *Dichopsis cuneata* F. Vill. Nov. App. 124, excl. syn.

This species was confused with *Bassia cuneata* Blume by both Fernandez-Villar and Vidal, that species, however, being a true *Bassia,* and moreover

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is confined to the Island of Java. *Palaquium cuneatum*, is well figured by Vidal. It is represented in the herbarium by No. 2993, Botolan, Province of Zambales, Luzon, June, 1903. Zambales, *Maliemic.*

PALAQUIUM CELEBICUM Burck, Ann. Jard. Bot. Buitenz. **5**: 32. 1886.

Sterile specimens of what is undoubtedly this species have been found in Mindanao—No. 839 (Ahern) and No. 19 (Sherman). This species yields much of the gutta-percha produced in Mindanao, and is known to the Moros as *Calapia.*

PALAQUIUM sp. indet.

This species, which is certainly undescribed, is represented in the herbarium by a single sterile specimen, collected at Iligan, District of Misamis, Mindanao by A. Alga. The leaves are glabrous, narrowly lanceolate and long-acuminate, 15 to 20 cm. long and 4 to 6 cm. wide, the nerves 16 to 18 pairs. Moro, *Buruan.*

PALAQUIUM MINDANAENSE Merrill, sp. nov.

A tree with ovate, acute, entirely glabrous leaves. Branches glabrous. Leaves 11 to 13 cm. long, 5 to 6 cm, wide, acute at both ends, shining above, pale beneath, nerves not prominent above, 13 to 14 pairs; petioles 3 to 3.5 cm. long. Flowers numerous, three or four in a fascicle, on the branches below the leaves. Peduncles 1 cm. long. Calyx lobes triangular, acute, brown-tomentose. Petals unknown. Fruit (immature) small, ovoid, 6 mm. in diameter.

Type specimen, No. 837 (Ahern), district of Cottabato, Mindanao, 1901.

A species is probably most closely related to *Palaquium celebicum* Burck, being distinguished by its smaller leaves, longer petioles, and other characters. Moro, *Calapía.*

PALAQUIUM LUZONIENSE (F. Vill.) Vidal, Rev. Pl. Vasc. Filip. 176. 1886. (*Dichopsis luzoniensis* F. Vill. Nov. App. 125. 1883; *Palaquium latifolium* Naves in Blanco, Fl. Filip. ed 3, *t.* 173, non Blanco.)

This distinct species is represented in the herbarium by No. 1761, Subig, Province of Zambales, Luzon, and Nos. 1927, 1944, and 1982, Pagbilao, Province of Tayabas, Luzon. Tagalog, *Dolitan, Tagatoy* and *Bagalangit.*

PALAQUIUM LANCEOLATUM Blanco, Fl. Filip. ed. 1, 403. 1837. (*Bassia lanceolata* A. DC. l. c., 199; *Dichopsis lanceolata* F. Vill. l. c. 124.)

This species, which must be considered as the type of the genus, has been imperfectly known, and previously no specimens have been collected representing the species since it was described by Blanco. It is represented in the herbarium by the following specimens: No. 42 Ahern, Dalupaon, Province of Camarines, Luzon, February, 1901. *Dulitan*; No. 2136, Pitoga, Province of Tayabas, Luzon, April, 1903. *Dolitan;* No. 2042, Guinayangan, Province of Tayabas, Luzon, April, 1903. No. 1096, Baler, Province of Principe, September, 1902. *Halibis;* No. 1991, Pagbilao, Tayabas, locally known as *Betis,* is also referred here, but the petioles of this specimen are much longer than in the other numbers referred to this species. The name *Betis* is usually applied to *Illipe betis.* The only native name Blanco gives for *Palaquium lanccolatum* is *Bagalañgit.*

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PALAQUIUM GUTTA Burck. and PALAQUIUM POLYANTHIUM (Benth. et Hook).

These species reported from Luzon by F. Villar,[1] are manifestly based on misinterpretation of species and should be excluded from the Philippine flora, as neither species extends to this region. Just what species F. Villar had in mind it will be impossible to determine, as no herbarium material has been preserved and no descriptions are given.

STEMONACEÆ.

STEMONA PHILIPPINENSIS Merrill, sp. nov.

A slender glabrous twining vine 1 to 2 m. high, or more, with alternate, deeply cordate, 9 to 11 nerved leaves, and small purplish-red axillary flowers. Leaves ovate-cordate, tapering to the slender acuminate apex, 7 to 10 cm. long, 3.5 to 5 cm. wide, shining, the sinus at the base nearly 1 cm. deep; petioles 1.5 to 2 cm. long. Peduncles 2 to 6 cm. long, solitary; bracts small, lanceolate, flowers purplish-red, 1 cm. long, the segments of the perianth lanceolate, acuminate, 7 to 9 nerved. Stamens erect, 9 to 10 mm. long.

Type specimen No. 3061, Island of Masbate, August, 1903. Visayan, *Sigid.*

A species perhaps most closely related to *Stemona minor* Hook. f., a species of Ceylon and Malabar, but differing from that species in its larger leaves, which have more numerous nerves, smaller flowers and other characters.

STEMONA TUBEROSA Lour.

This species was found at Point Separation, Paragua, February 18, 1903, distributed as No. 792. No species of this family has previously been reported from the Philippines.

TILIACEÆ.

COLONA LONGIPETIOLATA Merrill, sp. nov.

A small tree with nearly glabrous, long-petioled leaves and glabrous fruits. Young branches pubescent, becoming glabrous. Leaves ovate-lanceolate, 10 to 15 cm. long, 5 to 7 cm. wide, rounded or somewhat acute at the equilateral base, abruptly tapering to the long-acuminate apex, the upper surface scabrous and with few hairs on the midnerve and veins, glabrous beneath, the nerves prominent, 5 pairs; petioles 2 to 3 cm. long, beset with brown, stellate hairs; stipules lanceolate, acuminate, about 12 mm. long. Panicles terminal, 18 cm. long, the lower branches 8 to 10 cm. long. Flowers unknown. Fruit obovate, 2 cm. long, 1.5 to 2 cm. broad, the wings about 0.5 cm. broad; pedicels about 1 cm. long.

Type specimen No. 479 G. P. Ahern. Mariveles, Province of Bataan, Luzon, January 4, 1902.

A very distinct species, perhaps most closely related to *Colona blancoi*, but with smaller fruit which has much narrower wings than in that

[1] Nov. App. 124. 1883.

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species. It is distinguished from all described species in the genus by its long petioles. Tagalog, *Anilao lalaqui.*

COLONA BLANCOI (Rolfe). (*Columbia blancoi* Rolfe, Journ. Linn. Soc. Bot. **21**: 308. 1884; *C. floribundus* Naves in Blanco, Fl. Filip. ed. 3, *t. 312;* F. Vill. Nov. App. 30. 1880; *Colona serratifolia* Cav. var. *blancoi* O. Kuntze, Rev. Gen. Pl. **1**: 82. 1891.)

This form is in all respects worthy of specific rank, differing from *Colona serratifolia* in its much larger, broader leaves, longer petioles and larger fruits. It is represented in the herbarium by No. 1703, Antipolo. Province of Rizal, Luzon, March, 1903, and is known to the Tagalogs as *Manued.*

COLONA SERRATIFOLIA Cav. Ic. **4**: 47. *t. 370.* 1797. (*Columbia americana* Pers. Syn. Pl. **2**: 66. 1807; *C. serratifolia* DC. Prodr. **1**: 512. 1824; *C. inequalcrata* Turcz. Bull. Soc. Nat. Mosc. **31**: 233. 1858; *C. anilao* Blanco, Fl. Filip. ed. 1, 654, 1837.)

This variable species is at present represented in the herbarium by no less than sixteen specimens, representing a distribution from northern Luzon to Zamboanga and Davao in Mindanao. The vegetative characters of this species are exceedingly variable and it is probable that some authors would consider that the material here referred to *Colona serratifolia*, represents several species; however, no valid characters can be found by which to separate the several forms. *Columbia anilao*, considered as a distinct species by F. Villar, is undoubtedly identical with *Colona serratifolia. Columbia serratifolia* Blanco, non DC., is a species of *Grewia. Colona serratifolia* is known to the natives of the Philippines as *Anilao.*

TRIUMFETTA PROCUMBENS Forst.

This species is found along the seacoast from Madagascar to Australia and Polynesia, but previously has not been found in the Philippines. It is at present represented in the herbarium by No. 2387, Pola, Mindoro, May, 1903, and No. 3373, Pasacao, Province of Camarines, Luzon. It is apparently a rather common constituent of the strand vegetation in the Philippines.

VERBENACEÆ.

VITEX OVATA Thunb. Fl. Japon. 257. 1784. (*V. repens* Blanco, Fl. Filip. ed. 1, 513, 1837; *V. trifoliata* Linn. f. var. *unifoliata* Schauer in DC. Prodr. **11**: 683, 1847.)

This widely distributed species is apparently distinct from *V. trifoliata* L. f., to which it has been reduced by various authors. It is represented in our herbarium by No. 323, Aparri, Province of Cagayan, Luzon, June 22, 1902, and No. 898, Calapan, Mindoro, 1903. At both of these localities the trailing form only was found. On Lubang Island, however, in April, 1903, this form was found associated with *Vitex trifoliata* L. f., and no intergrading forms were observed. *V. trifoliata* L. f., was always an erect shrub, 2 to 3 m. high, with trifoliate leaves; while *V. ovata* Thunb., was

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always trailing, and with simple ovate or obovate leaves. *Vitex ovata* Thunb., is found on sandy sea beaches, where it is a valuable sand-binder, trailing 3 to 4 m., the stem rarely exceeding 1 cm. in diameter, and sending up numerous erect branches 1 to 6 dm. in length. No one seeing the two forms growing together would confuse them, as they appear very distinct. Tagalog, *Lagunding gapang.*

VITEX AHERNIANA Merrill, sp. nov.

A tree with coriaceous, glabrous, 3 to 5 digitate leaves, and few flowered axillary panicles. Leaves mostly 5-digitate; pedicels 3 to 4 cm. long, glabrous, or with few scattered hairs, and (in young leaves) with numerous fulvous-tomentose hairs at the apex; petiolules 4 to 10 mm. long, channeled above; leaflets glabrous and shining, coriaceous, ovate or lanceolate-ovate, acute at both ends, 5 to 7 cm. long, 2 to 2.5 cm. wide, nerves, 8 to 10 pairs, very obscure. Panicles axillary, few flowered, 12 cm. long, about equaling the leaves, more or less pubescent with usually appressed, fulvous hairs, branches few, the longer ones 3 to 5 cm. long; pedicles densely fulvous-pubescent, 2 to 4 mm. long. Calyx 4 mm. long, densely fulvous-pubescent, campanulate, 5-toothed, the teeth triangular, very short. Corolla purple, appressed fulvous-tomentose, deeply cleft, the tube about 4 mm. long, the lobes 6 to 8 mm. long. Drupe unknown.

This apparently very distinct species was collected by one of the employees of the Forestry Bureau, at Baler, Province of Principe, Luzon, August, 1902, and has been distributed as No. 1007. It has been dedicated to Capt. G. P. Ahern, Chief of the Forestry Bureau. This species is said to be abundant in the vicinity of Baler, and its timber is very valuable, being exceedingly hard and taking an excellent finish. Tagalog, *Igang.*

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II. THE AMERICAN ELEMENT IN THE PHILIPPINE FLORA.

By Elmer D. Merrill.

INTRODUCTION.

For a period of nearly three hundred years, from the establishment of Spanish authority in the Philippines up to the year 1815, the Archipelago was ruled as a dependency of Mexico, and throughout this period direct communication at first between Manila and Navidad, but later Acapulco, on the Pacific coast of Mexico, was maintained by means of the state galleons. With this long continued civil and commercial intercourse between the Philippines and Mexico it is not surprising that we find to-day many plants of American origin in the Philippines, most of them spontaneous, so widely distributed and so thoroughly naturalized as to appear truly indigenous.

The plants of American origin now found in the Philippines can be classified in two groups—those of economic or ornamental value purposely introduced and those the seeds of which have been accidentally introduced in packing material or by other methods.

Among the prominent species of the first group may be mentioned Tobacco (*Nicotiana tobacum*, and other species), Corn (*Zea mays*), Maguey (*Agave americana*), Achuete (*Bixa orellana*), Guava (*Psidium guayava*), Tomatoes (*Lycopersicum esculentum*), Potatoes (*Solanum tuberosum*), Papaya (*Carica papaya*), Cashew nuts (*Anacardium occidentale*), Cassava (*Manihot utilissima*), Cacao (*Theobroma cacao*), Pineapple (*Ananassa sativa*), and other species. Among those species introduced for ornamental purposes may be mentioned *Cestrum nocturnum, Bougainvillia spectabilis, Pithecolobium saman, Euphorbia pulcherrima, Quamoclit vulgaris, Petraea volubilis, Cosmos sulphureus,* and other species.

Of the second group, or those species, the seeds of which may have been accidentally introduced in packing material and which are now for the most part generally distributed as weeds in culti-

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vated fields, may be mentioned *Asclepias curassavica, Argemone mexicana, Mimosa pudica, Dalea nigricans, Prosopis juliflora, Lantana camara, Ageratum conyzoides,* and *Synedrella nodiflora.*

The date of the introduction of many of the American species is obscure, but for the larger per cent of those of economic importance it was in very early times. The first recorded notices of Philippine plants are found in the works of Mercado and Camell. The former author wrote some time during the last third of the sixteenth century, and after many vicissitudes his manuscript, entitled "Libro de medicinas de esta tierra y declaraciones de las vertudes de los árboles y plantas que están en estas islas filipinas," was edited and published by Padre Celestino Fernandez-Villar, in the fourth volume of the third edition of Blanco's Flora de Filipinas, in the year 1880. Mercado classified his species under their native names, and prepared water color drawings of the greater part of them, and accordingly F. Villar was enabled to determine the scientific names of a large number. Mercado's work contains references of many plants of American origin. At about the same date Padre Camell wrote his treatise on Philippine plants entitled "Herbarium aliarumque Stirpium in Insula Luzone Philippinarum primaria nascentium," etc., which was published in 1704, as an appendix to the third volume of Ray's Historia Plantarum. This work also enumerates many species of American origin. In the year 1892 there was published in Manila a work entitled "Historia general sacro-profano, política y natural de las islas poniente llamadas filipinas," written in the years 1751 to 1754 by a Jesuit priest, Juan J. Delgado. Over 400 pages of this work are occupied with a discussion of the plants of the Archipelago, and many species of American origin are noted. Blanco in his Flora de Filipinas, the first edition of which was published in 1837, the second in 1845, notes many American species, and frequently gives the exact or approximate date of the introduction of American species of economic value. In some cases he erroneously considered species of American origin as endemic and described them as new ones, while on the other hand he identified some truly endemic forms with American species. Fernandez-Villar, in his Novissima Appendix to the third edition of Blanco's Flora de Filipinas (1883), also notes many species of American origin, especially those which were introduced between the years 1845 and 1883.

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All of the species which have been accidentally introduced, and which were adapted to the climatic conditions here existing, are now found generally distributed throughout the Archipelago, or at least extending over very large areas while a very large number of those which were introduced for economic or ornamental purposes have become spontaneous and some species such as *Psidium guayava*, *Pithecolobium dulce*, and *Cosmos sulphureus*, are among the most common and widely distributed plants found in the Archipelago to-day, the former according to Delgado having become widely distributed in the Philippines as early as 1754.

It is not the object of the present paper to go into the details of the discussion regarding the country of origin of such widely cultivated species as the sweet potato (*Ipomoea batatas*), Gabi (*Colocasia antiquorum*), and the Cocoanut palm (*Cocos nucifera*). It is believed, however, that to-day these species are generally conceded to be of American origin. However, they were introduced into the East and in general cultivation throughout the tropical regions centuries before the advent of the Europeans in the Philippines.

Nearly all of the American species of economic importance and a very large percentage of those accidentally introduced and now found in the Philippines have been generally distributed throughout the tropics of the East by the same agencies by which they were introduced into this Archipelago, and at the present time one finds in other countries in the East comparatively few of the tropical American species which are not also found in the Philippines. The Philippines must be considered as the early distributing point of the American species in the Orient.

It is very probable that other species of American origin not noted in this paper will be found in the Philippines when thorough collections are made. Such species as *Cleome aculeatum*, *Tridax procumbens*, *Erigeron canadense*, and others already noted from British India and the Malayan peninsula are almost certain to be found sooner or later in the Philippines. Already since the American occupation at least four species of economic importance have been introduced into the Philippines from tropical America. These are the Mexican forage grass, "teosinte," *Euchlaena luxurians*, and the india rubber trees, *Hevea brasiliensis*, *Manihot glaziovii*, and *Castilloa elastica*. It is possible that all these species

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may have been introduced previous to the American occupation, but if such is the case we have no record of it and no specimens have been seen in cultivation other than those of very recent introduction.

ENUMERATION OF THE SPECIES.

ACANTHACEÆ.

BLECHUM BROWNEI Nees.

This herbaceous plant was evidently introduced long previous to the year 1837, as it is considered by Blanco in the first edition of his Flora de Filipinas. It is known to the natives as *Calaboa*, *Dyang*, and *Sapinsapin*. *B. haenkei* Nees is also enumerated by F. Villar.

AMARANTACEÆ.

GOMPHRENA GLOBOSA Linn.

This species was originally introduced for ornamental purposes, but is now spontaneous and widely distributed in the Archipelago, and is still much cultivated for ornament. The first reference to this species as a Philippine plant is in the first edition of Blanco's Flora de Filipinas in 1837.

ANACARDIACEÆ.

SPONDIAS PURPUREA Linn., and S. LUTEA Linn.

Both natives of tropical America are commonly cultivated in the Philippines for their edible fruits, having been introduced in the eighteenth century, according to F. Villar. Both species are known to the natives as *Siriuelas*, a corruption of the Spanish name *Ciruelas*.

ANACARDIUM OCCIDENTALE L.

The "cashew nut" was probably one of the earlier of the American plants of economic importance introduced into the Philippines, and is now found widely distributed, not only in this Archipelago, but throughout the tropics of the East. It is universally known to the natives of the Philippines as *Casoy* or *Casuy*, and by them it is prized for its fruits, which are not only edible but also the source of a valuable oil.

APOCINACEÆ.

PLUMIERA ACUTIFOLIA Poir.

A tree with very fragrant white or yellowish flowers extensively planted in the Philippines for ornamental purposes. It was introduced from Mexico at a very early date and is now generally found throughout the tropics of the East. It is known to the natives of the Philippines as *Calachuche*.

ALLAMANDA CATHARTICA Linn.

This species is first recorded from the Philippines by Blanco in 1845. It is a native of South America, and is cultivated for ornament in the Philip-

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pines. It has not as yet been found growing here spontaneously. It is known by the Spanish name *Campanero*.

AMARYLLIDACEÆ.

AGAVE AMERICANA L.

This species was introduced from Mexico at an early date, and is now extensively cultivated for its valuable fiber; large plantations being found in certain provinces. The identification of this species as *Agave americana* by Philippine authors is probably erroneous, the plant commonly cultivated being perhaps some other species. Several other species of this genus are reported by Naves, but little dependence can be placed on his identifications. The commonly cultivated species of *Agave* are known to the natives as *Maguey*.

ANONACEÆ.

ANONA MURICATA L., A. SQUAMOSA L., and A. RETICULATA L.

These three species were introduced into the Philippines at an early date and are all natives of tropical America. They are at present time found throughout the Archipelago in cultivation and spontaneous. The first is generally known to the natives as *Guanabanos*, the second as *Ates*, and the third as *Anonas*, being known to English-speaking people as "custard apples," "sweet sop," "sour sop," etc. The last two species at least are generally distributed in tropics of the East.

ASCLEPIACEÆ.

ASCLEPIAS CURASSAVICA Linn.

An erect perennial herb with milky sap and terminal umbels of orange-red flowers. This species is very abundant and widely distributed in the Philippines, but the date of its introduction is unknown, although it was described by Blanco in 1837; however, neither Mercado nor Camell consider it. It is a native of the West Indies, but is now widely distributed throughout the tropics of the world. It is used somewhat by the natives of the Philippines in the practice of medicine and is known by them as *Bubuyan*, *Bulac damo*, *Calalauan*, *Bulaç castila*, and other names.

BIGNONIACEÆ.

CRESCENTIA ALATA H. B. K.

This species must have been introduced from America many years anterior to the year 1837, as Blanco[1] states that he saw specimens in Manila and vicinity and described the plant as a new species, *Crescentia trifolia*. Later, in 1845, Blanco[2] states that the species was spontaneous in the central part of the Archipelago. This species is known to the natives by the name of *Hoya cruz*, from the peculiar shape of its leaves.

[1] Fl. Filip. ed. 1, 490.

[2] l. c. ed. 2. 343.

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BIXACEÆ.

BIXA ORELLANA L.

A shrub or small tree with white or purple flowers and prickly capsules containing many rather small red seeds. This plant was introduced from tropical America at a very early date and is now universally distributed throughout the Philippines, being generally found in and about towns. The seeds yield a red dye, used by the natives for coloring certain kinds of food. The bark also yields a yellow dye. It is universally known to the natives as *Achuete*, a word of Spanish-American origin.

BROMELIACEÆ.

ANANASSA SATIVA Lindl.

The "pine-apple" is found in general cultivation throughout the Philippines and in the tropics of the East, having been introduced from America at an early date. In southern Paragua it was found in abundance apparently growing spontaneously in the forests of the foothills, several miles from the nearest native settlement. This species is prized not only for its fruit but also for the valuable fiber which is secured from the leaves and which is extensively used in the Philippines in the manufacture of the so-called piña cloth. This plant is universally known to the natives as *Piña*.

CACTACEÆ.

NOPALEA COCCINELLIFERA Salm-Dyck., MELOCACTUS COMMUNIS Link, CEREUS TETRAGONUS Mill.

These and other species are reported by F. Villar as being cultivated in Manila and other localities in the Archipelago. None of the cacti are spontaneous here and can not be considered as elements of the Philippine flora.

CAPPARIDACEÆ.

GYNANDROPSIS SPECIOSA DC.

This American species, according to F. Villar, is cultivated in Manila, but no specimens have been seen.

CHENOPODIACEÆ.

ANREDERA SPICATA Pers.

This American species was evidently introduced long before the middle of the last century, as in 1837 it was so well established that Blanco considered it a native of the Archipelago and described it as a new species (*Gomphrena volubilis*). It is, however, not especially common, nor is it widely distribubted in the Archipelago.

BOUSSINGAULTIA BASSELLOIDES H. B. K

This tropical American species is commonly cultivated in Manila and is spontaneous in waste places in the suburbs of the city. It was introduced at a recent date, being first mentioned as a constituent of the Philippine flora by F. Villar in 1883. So far as known this species has no native name.

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CHENOPODIUM AMBROSIOIDES Linn.

This common and widely distributed species was introduced from America at a very early date and is now abundant in the Philippines. It is first recorded from the Philippines by Mercado. This plant is somewhat utilized by the natives in the practice of medicine, and is known by the names *Aposotis, Pasotis, Alposotis,* etc., of Spanish origin.

COMPOSITÆ.

AGERATUM CONYZOIDES L.

An annual herbaceous plant, 1 to 2 feet high, with numerous small heads of white or pale blue flowers in dense terminal corymbs. This species is undoubtedly of American origin, but is at the present time found throughout the tropics of the world. It is very abundant in the Philippines, not only in waste places in the vicinity of towns, but also in the mountains, being especially abundant along shaded trails in regions where there is abundant rainfall. So far as known this plant has no uses and the natives have no names for it.

COREOPSIS TINCTORIA Nutt.

F. Villar[1] states sub "*Corcopsis elegans* L.," that he saw this species in cultivation in Manila. It is a native of North America, and if cultivated in the Philippines at the present time it is certainly not common.

COSMOS CAUDATUS H. B. K., and COSMOS SULPHUREUS Cav.

Herbaceous plants with pinnatifid leaves, the former with pink and the latter with yellow flowers. These two species were introduced from Mexico, probably some time in the first half of the nineteenth century, for ornamental purposes, as Blanco mentions neither in the first edition of his Flora de Filipinas 1837, but describes the latter under the name of *Corcopsis gracilis* in the second edition of the same work in 1845. At this time, however, according to Blanco, the plant in question was only cultivated in Manila. At present both species are found not only in cultivation but also spontaneous in most parts of the Archipelago, especially in the vicinity of towns. The former species is also found in India, Mauritius, and other places in the East.

ELEPHANTOPUS SPICATUS Juss., and E. SCABER Linn.

These two species, now cosmopolitan in the tropics of the world, are doubtless both of American origin, having been distributed as weeds at an early date. Both species are very common in the Philippines, and were found here previous to the year 1837 as they are both mentioned by Blanco. The natives know these species under such names as *Dilang-aso, Tabatabacahan, Diladila,* etc.

SYNEDRELLA NODIFLORA Gaertn.

An annual, erect herb with sessile heads of yellow flowers. This species is a native of Mexico and was probably introduced into the Philippines in packing material, at present time being very common about Manila

[1] Nov. App. Fl. Filip. 118, 1883.

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and also about other towns in the Archipelago. It has been generally distributed throughout the tropics of the East.

CONVOLVULACEÆ.

IPOMOEA BLANCOI Choisy.

This species is described by Blanco under the name of *Convolvulus dentatus*, and is the species figured in the third edition of the Flora de Filipinas as *Ipomoea commutata*. Dr. H. Hallier is of the opinion that this species is not a native of the Philippines, but has been introduced from America. At the present time the species is very common about towns in the Philippines, and if introduced, the introduction must have been at a comparatively early date.

IPOMOEA BONA-NOX Linn.

This species is spontaneous and widely distributed in the Philippines at the present time, although it was undoubtedly introduced primarily for ornamental purposes. It is first noted from the Philippines by Blanco in 1837. It is known to the natives as *Malacamote* and *Calacamote*, literally "false sweet potato."

IPOMOEA HEDERACEA Jacq.

A twining, herbaceous vine, 6 to 10 feet long, with very hirsute sepals and a showy funnel-shaped corolla, at first pale blue but gradually changing to rose color. This species is spontaneous and common in waste places about Manila and other portions of the Archipelago. It is undoubtedly a native of tropical America, but is now cultivated for ornament and naturalized throughout the Tropics. It was introduced in early times, as it is considered by Mercado. It is known by the Tagalogs as *Bulacan*, a name applied generally to species of the *Convolvulaceæ*.

IPOMOEA PURPUREA Roth.

This species is somewhat cultivated in Manila for ornamental purposes, but has not been observed growing spontaneously. *Rivea corymbosa* Hallier (*Ipomoea sidaefolia* Choisy) is also frequently found in cultivation. Neither species is common, and so far as known have no distinctive native names.

QUAMOCLIT VULGARIS Choisy, and QUAMOCLIT COCCINEA Linn.

Slender, glabrous, herbaceous vines with crimson or sometimes white or yellow flowers, the former species with pinnate leaves and the latter with entire leaves. Both species are natives of tropical America, and are now commonly found in cultivation and occassionally spontaneous in the Philippines and also throughout British India and other tropical countries in the East. *Quamoclit vulgaris* was introduced at an early date, but *Q. coccinea* was probably not brought here before the middle of the nineteenth century as it is not considered by Blanco. The former is known to the natives as *Agoho* and *Malabohoc*, but the latter has no native name as far as is known.

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EUPHORBIACEÆ.

EUPHORBIA PULCHERRIMA Willd. and E. SPLENDENS Bojer.

These are reported by F. Villar as being cultivated for ornamental purposes; however, neither species is spontaneous. The former is common in Manila and is known as *Pascuas*.

MANIHOT UTILISSIMA Pohl.

"Cassava" or "tapioca," a tall, herbaceous plant with tuberous roots, introduced from tropical America at an early date and now found in general cultivation throughout the Archipelago. A valuable food plant, known to the natives as *Camoting-cahoy*.

EUPATORIUM AYAPANA Vent.

This aromatic herbaceous plant, a native of Brazil, was introduced into the Philippines previous to the year 1837, probably for the reason that it possesses medicinal qualities. It is known to the natives as *Ayapana* or *Apana*, names of American origin, and is much used by them in the practice of medicine. *Eupatorium odoratum* Linn., a West Indian species, now found in British India, has not as yet been reported from the Philippines.

JATROPHA CURCAS Linn.

This American species was introduced into the Philippines previous to the year 1750, as it is mentioned by Delgado; however, Mercado writing over half a century previous to this date does not mention it. This species is now one of the most widely distributed plants of American origin in the Philippines, but is usually found in and near towns. It is now generally cultivated throughout the tropics of the world. In the Philippines it is most commonly found in cultivation as a hedge plant, its easy propagation and its rapid growth making it especially adaptable to this purpose. The milky sap of the stem and leaves, and the seeds are drastic purgatives, and the seeds yield an oil considerably used in the Philippines for illuminating purposes. It is known to the natives as *Casla*, *Tuba* and *Tawitawi*.

JATROPHA MULTIFIDA Linn.

This species was probably introduced at a much later date than the preceding, the first reference to it as a constituent of the Philippine flora being by Blanco in the year 1837. It possesses the same qualities as the preceding species, but is by no means as common in the Archipelago. It is known to the natives as *Mana*. *Jatropha gossypifolia* Linn., another American species, found in Burma and Singapore, has not as yet been reported from the Philippines.

FILICES.

ADIANTUM TENERUM Sw.

This species is somewhat cultivated in Manila for ornamental purposes, but is not spontaneous. It is a native of South America.

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GERANIACEÆ.

AVERRHOA BILIMBI Linn., and A. CARAMBOLA Linn.

These two species are found in cultivation throughout the tropics of the world, but are undoubtedly of American origin, although this point is not clear. Hooker[1] is of the opinion that both species were introduced into India by the Portuguese. Both species were recorded from the Philippines by Mercado. *Averroha bilimbi* has pubescent leaves and its fruit has rounded lobes, and is known to the natives as *Balimbing*, *Bilimbines*, etc. *Averrhoa carambola* has glabrous leaves and its fruit has acute lobes, being known to the natives as *Camias*, *Pias*, *Iba*, and other names.

GRAMINEÆ.

PASPALUM CONJUGATUM Berg.

This very common grass is said by Hooker[2] to have been introduced into Ceylon from America. It is possible that this was originally an American plant, but at the present time it is found throughout the tropical and subtropical regions of the world. It is now one of the most common and most widely distributed species in the Philippines, but is usually found only in the vicinity of towns. From its habitat and distribution it is evident that it is not a native of the Philippines, but it is impossible to determine the original home of the species at this time.

ZEA MAYS L.

Indian corn is too well known to need much discussion, but was probably one of the earliest of the American plants introduced into the Philippines. It is now generally cultivated throughout the tropical and temperate regions of the world. It is extensively cultivated in the Philippines and is universally known to the natives as *Maiz*.

LABIATEÆ.

HYPTIS spp.

Six species of *Hyptis*, all presumably of American origin, are enumerated by F. Villar as being found in the Philippines, and at least four of these species are common and widely distributed in the Archipelago. *Hyptis spicigera* Lam., *H. capitata* Jacq., *H. brevipes* Poir., *H. suaveolens* Poir., *H. spicata* Poir., and *H. pectinata* Poir., are the species credited to the Archipelago by F. Villar. The first four of these species are common and widely distributed in the Philippines, *H. spicigera* and *H. suaveolens* being usually found in waste places in the vicinity of towns, while *H. brevipes* and *H. capitata* are found not only in the vicinity of towns, but also distributed along trails in the mountains and in open lands generally. The last two species are unknown to me at present. Probably all these species were introduced into the Philippines accidentally in packing material or by other methods. One species is noted by Mercado, *H. capitata*, in

[1] Fl. Brit. Ind. **5**: 439.

[2] Trimen & Hooker, Fl. Ceylon **5**: 122. 1900.

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the last third of the sixteenth century, while Blanco in 1837 notes four species. The various species are known to the natives by such names as *Combarcombaran*, *Lingalingahan*, *Palapasagui*, *Locoloco*, *Pansipansihan*, etc.

MALPHIGIACEÆ.

GALPHIMIA GLAUCA Cav.

This ornamental shrub is somewhat cultivated in Manila, but is not spontaneous. This species has not previously been recorded from the Philippines, and is probably of very recent introduction.

MALVACEÆ.

MALACHRA BRACTEATA Cav.

F. Villar credits this species to the Philippines, but the plant he identifies as this species is *Malachra lincariloba* Turcz., a species described from Philippine material. We have at present no available description of *Malachra bracteata*, and it is possible that F. Villar was correct in his identification of the Philippine plant with this American species. The plant in question is common and widely distributed in the Philippines.

MARANTACEÆ.

MARANTA ARUNDINACEA Linn.

The well-known arrowroot plant is at the present time rather common in the Philippines, where it is cultivated both for ornamental purposes and for its edible roots. It is frequently subspontaneous about towns. This species is noted by Blanco in the second edition of his Flora de Filipinas, but when the plant was introduced is unknown. It is known to the natives as *Araro*, *Aroru*, and *Arrou-rou*, evidently corruptions of the common English name of this plant.

LEGUMINOSEÆ.

ARACHIS HYPOGÆA Linn.

The "peanut" is frequently found in cultivation in the Philippines and generally throughout the East. It is, however, undoubtedly of American origin, having been introduced into the East at an early date. So far as is observed this species is nowhere spontaneous in the Philippines. It is known to the natives by the Mexican name *Cacuate*, but more commonly by the name *Mani*.

CÆSALPINIA PULCHERRIMA Swartz.

A small shrub, with showy racemes of red flowers, widely distributed in the Archipelago, but usually found in the vicinity of towns. The natives have no name for this species other than the Spanish word *caballero* from which it is very evident that this species has been introduced into the Philippines since the Spanish occupation. The native country of this plant is not clearly known, but is probably tropical America. At the present time it is found in cultivation throughout India and Ceylon and elsewhere in the

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tropics. The other species of this genus most closely related to *Cæsalpinia pulcherrima* are, it is believed, all natives of tropical America. According to F. Villar[1] this plant was figured but not described by Mercado in his Libro de Medicinas, written in the last third of the seventeenth century, evidence that it was introduced early in the Spanish occupation.

CASSIA ALATA L.

A small shrub with yellow flowers and winged pods, common about towns throughout the Archipelago, but certainly not a native of the Philippines. This species is said to be cosmopolitan in the tropics, but the Mexican name *Acapulco*, commonly used by the natives in designating this plant, would indicate an American origin, at least for the plant as found in the Philippines. It is extensively used by the natives in the practice of medicine.

CASSIA OBTUSIFOLIA Linn., C. HIRSUTA Linn., C. OCCIDENTALIS Linn., and C. SOPHERA Linn.

All these species are of American origin, but are now generally distributed throughout the tropics of the East. They are all herbaceous plants or undershrubs, and are usually found in waste places in the vicinity of towns. Like the preceding species they all belong to the section *Senna*, and several of the species are utilized by the natives in the practice of medicine.

DALEA NIGRA Mart. et Gall.

An erect herbaceous plant 1 to 2 feet in height, with pinnate leaves and capitate heads of purple flowers, common and widely distributed in the Archipelago, growing in open grass lands and in cultivated places. It is not known when or how this Mexican species was introduced, but its introduction was probably accidental and at an early date. It is now spontaneous and thoroughly naturalized in the Philippines. Blanco described this plant in 1837 as *Amorpha alopecuroides* Willd. It is known by the natives under several names, such as *Durang parang*, *Agogo*, *Sampaloc-sampalocan*, *Camangi*, etc.

MIMOSA PUDICA L.

A low prostrate herbaceous plant with numerous globose heads of pink flowers and sensitive leaflets. The native country of this species is not clearly known, but it is probably tropical America. It is now spontaneous throughout the tropics of the East and is one of the most pernicious weeds with which the tropical agriculturist has to deal. In the last third of the seventeenth century it was evidently known in the Philippines only by the Spanish name *Hierba mimosa*, as it is classified under this name by Mercado. To-day it is known by the Tagalogs as *Damohia* and *Macahiya*, and by the Visayans as *Huya huya*. It is to-day one of the most common and widely distributed species in the Philippines.

GLIRICIDIA MACULATA H. B. K.

A small tree with pinnate leaves and white or pinkish flowers, introduced from tropical America, according to F. Villar[2] in the eighteenth century. It was described by Blanco in the first edition of his Flora de Filipinas as

[1] Nov. App. Fl. Filip. 69, 1883.

[2] L. c., 59. 1883.

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a new species *Galedupa pungam*. This tree is one of very rapid growth and was introduced for the purpose of furnishing shade for cacao trees, for which purpose it is still used. It is universally known by the natives by the Spanish name of *Madre cacao*. This species is at present cultivated in many cacao plantations and is also spontaneous in many localities. It is generally distributed throughout the Archipelago.

INDIGOFERA ANIL Linn.

This species, known locally as *Anil*, was introduced from America, and with *Indigofera tinctoria* is somewhat cultivated for indigo, and spontaneous. It is frequently known by the name *Tagum*, which is also applied to other species of the genus.

LEUCÆNA GLAUCA Benth.

A shrub with dense globose heads of white flowers, common in waste places about Manila and other towns in the Philippines. This species is undoubtedly of American origin, but is now generally distributed throughout the tropics. It is evidently of comparatively recent introduction in the Philippines, as it is not considered by Blanco as late as the year 1845. Some Tagalogs know this plant by the name of *Agho*, but most natives have no name for the species.

PITHECOLOBIUM SAMAN Benth.

This species is very abundant in Manila, being extensively planted for shade purposes and is apparently entirely adapted to the climatic conditions existing here. It was introduced from the West Indies by Don Zoilo Espejo, the first director of the Botanical Garden in Manila, in about the year 1860. Without exception it is the most valuable shade tree we have today in the city, and is being more extensively used for this purpose every year. A large portion of the Botanical Garden is occupied almost exclusively by this species, which is one of the very few trees that seems to thrive under the conditions there existing. It does not fruit freely in Manila, although it produces an abundance of flowers. So far as is known the natives have no name for it. In the West Indies it is known as the "rain tree" from the fact that at the approach of a storm the sensitive leaves droop, the leaflets becoming closed and remaining in this position throughout the duration of the storm. The leaflets also close at night.

PITHECOLOBIUM DULCE Benth.

A medium-sized tree now very common throughout the Philippines, introduced from tropical America in early times by the Spaniards. It is considered by both Mercado and Camell, and known by the natives, as *Camanchiles*. It is much prized by the natives for its white or pink, pulpy, fleshy, edible aril, which half surrounds the seeds. From the Philippines it has been generally distributed throughout the tropics of the East, and is commonly cultivated. In India it is known as the "Manila tamarind," probably from the similarity of its fleshy aril to the fleshy mesocarp of the true tamarind (*Tamarindus indica*). The natives of the Philippines use the bark of this species extensively for the purpose of tanning leather.

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PHASEOLUS LUNATUS Linn.

This universally cultivated bean is probably of American origin, but is now found throughout the tropics of the world. It is common in the Philippines in cultivation, and is known to the natives as *Haba*, *Zabache*, and *Patini*, the two former words being of Spanish origin, evidence that the plant was introduced into the Philippines by the Spaniards.

PROSOPIS JULIFLORA DC.

A shrub with spiny branches and cylindrical spikes of yellowish flowers, common about Manila and widely distributed along the shores of Manila Bay, in many places exclusively occupying large areas. This species is a native of tropical America and has evidently been introduced into the Philippines at a comparatively recent date, as it is not considered by Blanco or the earlier authors. It is entirely adapted to conditions here and grows as though it were a native rather than an introduced plant. Naves considered it as a native plant and described it as a new species *Prosopis vidaliana*, first in a periodical published in Manila and later during the same year (1877) in a pamphlet entitled "Prosopis vidaliana," giving a very full description with two plates. It is known by the Tagalogs as *Aroma*, a name also applied to *Acacia farnesiana* Willd.

LILIACEÆ.

YUCCA ALOIFOLIA Linn.

This and two other species of this genus of American origin are noted by F. Villar as being cultivated in Manila. None of the species are spontaneous.

MYRTACEÆ.

PSIDIUM GUAYAVA L.

A shrub or small tree with white flowers and edible fruits, introduced from tropical America at a very early date and now one of the most common and widely distributed species in the Archipelago, being found not only in and about towns and villages, where it is cultivated for its edible fruit, but also in the wilder and more inaccessible portions of the Archipelago, its wide distribution being due to the fact that the numerous small seeds have been disseminated by birds and monkeys. This species is found generally throughout the tropics of the East. In the Philippines it is known by the natives as *Guayabas* and *Bayabas*, names of Spanish origin. Several varieties of this species are also found in the Philippines.

NYCTAGINACEÆ.

BOUGAINVILLEA SPECTABILIS Willd.

This striking ornamental plant, now found in general cultivation in tropical and subtropical regions was introduced from tropical America some time between the years 1845 and 1880, as it is considered by F. Villar, but not by Blanco. It is commonly cultivated for ornamental purposes in Manila, but is not spontaneous.

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